CLAIMS

1. A device for transferring bulk material from a reservoir or a holding space through a lock space into a pneumatic conveyor line, wherein the lock space is closable in relation to the reservoir or holding space by an axially movable closure body and at least one counterpart sealing element in opposite relationship thereto in its path of movement, characterised in that the closure body (64, 64_a) has at least one vent opening (62) which opens into an air discharge passage and is closable in the upward closing movement (y) of a stroke element (52, 52_a) with a sealing body (56, 56_a), wherein its downward opening travel (x) is shorter than the downward travel of the stroke element with the sealing body.

2. A device as set forth in claim 1 characterised in that the closure body (64, 64_a) is enlarged from a narrow cross-section forming an inner sealing edge (63) towards the sealing body (56, 56_a) in a funnel-like configuration and the narrow cross-section is the annular seat for the sealing body in the closure position.

3. A device as set forth in claim 1 or claim 2 characterised in that an air discharge passage (60; 60_a, 61) goes from the vent opening (62) of the closure body (64, 64_a) to an aperture (40) in an intake housing (34) arranged upstream of the lock space (24) and the air discharge passage can be connected at the aperture to a discharge air line.

4. A device as set forth in one of claims 1 through 3 characterised in that the sealing body (56, 56_a) is provided with a cone tip (57) for the annular seat (63).

5. A device as set forth in one of claims 1 through 4 characterised in that in the region of its vent opening (62) the closure body (64, 64_a) is

connected to an air guide element (60; 60_a, 61) which is variable in length, as an air discharge passage.

6. A device as set forth in claim 5 characterised by a bellows member (60) as the air guide element.

7. A device as set forth in claim 5 characterised by tube elements (60_a, 61) which are displaceable axially in relation to each other telescopically as the air guide element.

8. A device as set forth in claim 7 characterised by a hollow profile member (60_a) which is attached to the closure body (64, 64_a) and which at the other end is axially displaceably supported in a head profile member (61) partially embracing it.

9. A device as set forth in claim 7 or claim 8 characterised in that an external bead (76) is provided at the end of the hollow profile member (60_a), which end is remote from the closure body (64, 64_a), and is adapted to butt against an internal collar (78) of the surrounding head profile member (61).

10. A device as set forth in one of claims 1 through 9 characterised in that disposed in opposite relationship to the lower edge (66) of the funnel configuration of the closure body (64, 64_a) are abutment elements (58, 58_a) provided in the lock space (24).

11. A device as set forth in one of claims 3 through 10 characterised by a reduced pressure source (41) at the air discharge passage (60; 60_a, 61), at which an injector (41) is optionally arranged.

12. A device as set forth in one of claims 1 through 11 characterised in that the closure body (64, 64_a) which is movable in the lock space (24) is surrounded by a substantially stationary sealing edge (70, 91) as a counterpart sealing member.

13. A device as set forth in claim 12 characterised in that a blowing device (32) for producing an air curtain is associated with the sealing edge (70, 91) and the closure body (64, 64_a).

14. A device as set forth in claim 13 characterised in that the blowing device (32) is in the form of an annular gap nozzle with a tangential air feed (33).

15. A device as set forth in claim 13 or claim 14 characterised in that the sealing edge (70, 91) and the blowing device (32) are arranged in the transitional region between the intake housing (34) and the lock space (24) or a lock housing (22) surrounding the latter.

16. A device as set forth in claim 14 or claim 15 characterised in that the blowing device (32) with its air feed (33) forms a separate annular insert between the intake housing (34) and the lock housing (22).

17. A device as set forth in one of claims 1 through 16 characterised in that the lock space (24) is at least partially provided with an air-guidable lining, in particular with a porous cone (80).

18. A device as set forth in one of claims 1 through 17 characterised in that a valve (82) is arranged downstream of the lock space (24) and is switchable alternately with the closure body (64, 64_a) arranged upstream of the lock space in the inward transfer direction (x).

19. A device as set forth in claim 18 characterised by a blowing device (88) associated with the valve seat (86) for the valve (82), in particular an annular gap nozzle.

20. A device as set forth in one of claims 1 through 19 characterised in that a conveyor air partial flow introduction means (15, 16) is arranged downstream of the lock space (24) at its outlet.

21. A device as set forth in one of claims 1 through 20 characterised in that the stroke drive for the sealing body (56) comprises a bellows-type cylinder (52).

22. A device as set forth in one of claims 1 through 21 characterised in that the stroke drive for the sealing body (46_a) comprises a pneumatic cylinder (52_a) with piston (53), in particular with a plunger piston.

23. A device as set forth in claim 21 or claim 22 characterised in that the closure body (64, 64_a) on the one hand and stationary parts of the stroke drive (52_a) on the other hand are provided with arrangements (58_a, 65) for stepwise rotation of the closure body about its longitudinal axis (A) during its stroke movement.

24, A device as set forth in one of claims 21 through 23 characterised in that the bellows-type cylinder (52) or the pneumatic cylinder (52_a) is arranged on a carrier plate (50) in the lock space (24).

25. A device as set forth in claim 9, claim 23 or claim 24 characterised in that the abutment elements (58, 58_a) or the arrangements (65) on the lock space side are fixed to the carrier plate (50) on bar members (48) holding the latter.

26. A device as set forth in one of claims 1 through 25 characterised in that one of the counterpart sealing elements is a flexible sealing surface (90) which is clamped in respect of its cross-section at one end and the other is a sealing edge (91) which entrains the free edge region of the sealing surface and which increasingly deforms it in the path of movement, wherein the sealing surface (90) is preferably a ring surrounding the closure body (64, 64_a).

27. A device as set forth in claim 26 characterised in that the sealing surface is a sealing lip (90) which is clamped in respect of its cross-section at one end on the housing side and the closure body (64_a) is provided with at least one projecting sealing edge (94) and with at least one entrainment portion (92) engaging under the sealing lip.

28. A device as set forth in claim 27 characterised in that the closure body (64_a) which enlarges in a funnel-like configuration in opposite relationship to the stroke direction (y) is deformed inwardly near its funnel edge forming the sealing edge (94) and its inclined edge portion (95), wherein the entrainment portions (92) possibly project from the inclined edge portion.

29. A device as set forth in one of claims 26 through 28 characterised in that the thickness (t) of the sealing lip (90) is larger than the spacing (z) of the entrainment portion or portions (92) from the sealing edge (94).

30. A device as set forth in claim 26 characterised in that the deformable seal (90) is part of the closure body (64_a) and its lip edge (91) is inclined relative to the edge of the stationary opening of the device.

31. A device as set forth in one of claims 26 through 30 characterised in that the sealing lip (90) is held clampingly at one end between two flanges (80) and/or the sealing lip (90) is inclined downwardly in cross-section at an angle (w) from its clamping location (89).

32. A device as set forth in one of claims 1 through 9 characterised in that the lip edge (91) of the sealing lip (90) in the relaxed position thereof extends substantially parallel to the stroke travel (y) or the longitudinal axis (A) of the device (10).

33. A device as set forth in one of claims 1 through 32 characterised in that connected to a compressed air source (96) is a comparator (98) to which there are connected a feed line (100) for the actual conveyor pressure of the lock device (10, 10_a) and a feed line (100_a) from a reference value generator (102).

34. A device as set forth in claim 33 characterised in that extending from the comparator (98) is a compressed air line (104) for the blowing device (32) and/or a compressed air line (104_a) for an annular gap nozzle (15) at the air discharge (40) of the intake housing (34) or the air-guidable lining (80) of the lock space (24) respectively.

35. A method of transferring bulk material from a reservoir or a holding space through a lock space into a pneumatic conveyor conduit by means of the device as set forth in at least one of the preceding claims characterised in that air displaced from the lock space during the introduction of the bulk material is discharged through at least one vent opening in the closure body which goes into an air discharge passage.

36. A method as set forth in claim 35 characterised in that the displaced air is sucked out of the lock space (24).

37. A method as set forth in claim 35 characterised in that the conveyor air is fed to the device at at least two feed-in locations and said feed-in locations are controlled alternately in dependence on a predetermined reference value of the conveyor pressure and an instantaneous actual value of the conveyor pressure, wherein air in-feeds into the conveyor line connected downstream of the device are possibly coupled to the conveyor air in-feed connected downstream of the lock space.